## Drivers & Products

<table>
<thead>
<tr>
<th>Time Frame</th>
<th>Driver</th>
<th>Product</th>
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| 8 days- 2 weeks     | • weather forecasters  
                     • Emergency management  
                     • Fishing fleet  
                     • Fuel resupply/ Public safety / Aviation | • guidance for forecast  
                                    • increased chance of storminess  
                                    • ice edge; freezing spray  
                                    • advance notice of prolonged cold/warm |
| 3-4 weeks           | • River Forecast Center  
                     • Oil & Gas Regulators | • river ice breakup guidance  
                                    • sea ice break-up/freeze-up |
| 1-2 months          | • Fire weather forecasters | • fuel condition/dryness/storminess/ precipitation temporal distribution |
| 3-6 months          | • Industry operational planning | • scheduling: site access probability/ ice road construction window |
| 6-8 months          | • Industry operational planning | • Freeze-up/Break up probabilities |
| Interannual & Beyond| • Fishery managers  
                     • Engineers | • sea ice/ocean condition for stock assessment  
                                    • precipitation amount/type for design |
Initialization data to improve predictions

• Considered “low hanging fruit” for improving predictions
  – Regarding initialization for sea ice forecasts,
    • better use of upper ocean information for ice freeze up forecasts
    • ice thickness information may also improve summer predictions

• More general challenges
  – Effectively using available observations
  – Obtaining new observations
    • encourage useful observations from “ships of opportunity”, industry, etc.? 
    • new instrumentation for ice-covered waters?
  – Can we determine what data will be useful for predictions of other aspects of the Arctic system

• In longer term, we need a better understanding of where and what critical observations are needed for Arctic prediction
  – Design observing networks to fit these needs
Evaluating and Improving Predictions

• Low hanging fruit:
  – Assessment of existing systems (NMME) for high latitudes
  – Using NWP knowledge to inform evaluation metrics
  – Better capitalize on existing/ongoing research (synthesis efforts?)

• Longer term challenge of improving predictions
  – Need to understand (and communicate) inherent limits of predictability
  – Need for enhanced process understanding and improvements in models
    • Coupling across system components, Cloud microphysics